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ABSTRACT

Two studies--conducted in 1987 and 1988 in high schools in the Madison, Wisconsin, Metropolitan School District--investigated the existence of gender related differences in high school elective computer courses and factors affecting the differences. In the first study, a two-part survey was administered to the total population of students enrolled in high school elective computer courses. One hundred sixty-six students (104 males, 62 females) responded to the questionnaire, which addressed attitudes toward computer use. Chi-square test of population and analysis of variance (one way ANOVA) were used to analyze results, which indicated that the differences between males and females in beginning and intermediate classes were most apparent in the role models available to the students, sex bias, and their view of gender differences. The general attitude of the students, perceived usefulness, and self-confidence in use of computers did not produce significant differences. The second study was conducted as a follow-up to extend these findings. Students who were not enrolled in computer courses as well as the students enrolled in computer courses were surveyed. Three hundred twenty-eight (195 males, 133 females) responded to the two-part questionnaire, and the Mann-Whitney U test was used to determine any differences between the two groups of students. Plans for taking a computer course after high school or for having a computer related job, perceived usefulness of computers, general attitudes toward computers, and confidence with computers were all more positive for computer course students and those who intend to take a computer course. Four appendixes contain charts and tables displaying the results of the data analyses, responses to interview questions, and a copy of the computer survey questionnaire. (22 references) (CGD)

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Gender Differences in the Selection of Elective Computer Science Courses

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INTRODUCTION

Computer use in our society is growing at an extremely rapid pace. Many aspects of our daily lives such as shopping, banking and workplace activities have changed dramatically because of the effects of computers. The U.S. Department of Labor estimates that 50-75% of jobs will involve computers in some way by the time today's high school students enter the job market (Sanders, 1984). In this decade and increasingly in decades to come, computer related fields will be offering many of our society's best professional employment opportunities (Sanders, 1984). During the last five years, educators throughout the United States have recognized this trend and have responded by increasing the incorporation of computer study in schools.

As computers become increasingly accepted in schools, many people are concerned that gender equity is being ignored. According to Anderson et al.(1984) and Lockheed et al.(1984), computer learning opportunities are less common among females. This problem seems to stem from the already well-defined pattern of inequality, which exists throughout our school curricula and society in general. Indeed, computer study may be exacerbating this situation by reinforcing existing gender inequities rather than encouraging educational equity (Schubert, 1986).

This problem of inequity in computer studies (i.e. unequal access to computer resources by females) has several serious implications for the future. Anderson et al. (1984) write:

> Educational computer inequity threatens to separate groups and communities by giving some people more effective tools for living in the age of computer information systems (p.10).

Sanders (1984) supports this view by arguing that gender related differences among students today in computer education are likely to result in occupational and economic sex discrepancy in the future.

In many elementary and middle schools, students' participation in computer classes is compulsory, and thus, every student in those schools should have equal opportunities to learn about computers. However, a number of recent studies have indicated that most of the students working with computers at the high school level are male, and as age increases, female enrollment in computer classes decreases. For instance, in a study of Princeton High School students, it was found that 60% of male students, and only 8% of female students used school computers voluntarily before, during, and/or after classes (Sanders, 1984). Also, in a study of freshman students from an introductory psychology class at a midwestern state university, Dambrot et al. (1985) found that female students showed more negative attitudes toward computers and scored lower in computer aptitude tests than male students. Furthermore, McCain(1983) found that female students show a tendency to take general introductory computer courses rather than more advanced courses.

Other studies have found sex not to be significantly related to students' computing abilities and their attitudes toward computers. For example, Loyd and Gressard (1984) surveyed 354 high school and college students concerning their attitudes toward computers. They found no evidence to indicate any difference between males and females in terms of computer anxiety, computer confidence, and computer liking. Further, Mandinach and Fisher (1985) found that females and males performed similarly once they enrolled in computer programming courses.

The results are inconclusive concerning gender equity in computer classes in high schools. Some school districts may differ from others in regard to this problem. The ratio of males in computer classes may differ according to the level of the class. Finally, where gender related differences in high school courses can be found, the factors which contribute to the problem are yet fully understood.

Educators need to realize serious impacts of gender inequity on students' future and try to achieve gender equity in computer education. Thus, the first step in this process is to identify possible factors influencing the differences. As Schubert (1986) contends, gender related differences in computer education are influenced more by external factors than by internal ones, and hindrances to equitable encouragement of female and male students' computer learning are due to various sources. It is possible that in some cases, gender related differences may be influenced by social expectations, familial influences, peer pressure, career plans, and school policies which assign differential attitudes towards computer study to male and female high school students.

PURPOSE

The purpose of the present studies was to investigate the existence of gender related differences in high school elective computer courses in a midwestern urban area and factors affecting the differences. A 1987 study and a 1988 follow-up study have been conducted to the students enrolled in high schools in the Madison Metropolitan School District in the state of Wisconsin. The first study focused on three key areas of concern. First, it examined to what extent if any, there existed gender related differences in actual enrollment figures. Second, it also seeks to determine whether gender related differences were in any way related to computer course levels. Third, it explored possible factors influencing the differences. Previous research indicates that there may exist a relationship between students' attitudes toward computers and their participation in computer classes. Further, these attitudes may be related to other factors such as role models and future career plans. The study intended to identify high school students' attitude toward computers and to determine whether they differ in relation to student gender, computer course level, role models, experience with computers, and students' future plans concerning computer careers.

A study follow-up conducted to extend the findings of the first study. In the second study, the students who were not enrolled in elective computer courses as well as those who were enrolled in the courses were surveyed. The purpose of the study was to examine differences between students who have taken at least one elective computer course and those who have not taken any in relation to their gender, attitude toward computers, experience with computers, plans for taking more high school computer classes, future plans concerning computer careers, and role models. In addition, the researchers explored how students who have taken at least one elective computer course felt about the overall course, and peers and teachers in the course.

STUDY 1

Objectives

The following research questions were examined:

1) Is there a gender related difference in enrollment in computer courses?

2) Does the difference in enrollment change as the level of computer class increases?

3) Do gender and course level related differences exist among students enrolled in computer classes in terms of the following criteria:

general attitudes toward computers
confidence with computers
perceived usefulness of computers
gender related bias toward computer use
plans for further computer study or professional work
role models
experience with computers

Method

A survey was administered to the total population of students enrolled in high school elective computer courses in the Madison Metropolitan School District during the fall of 1987. There were a total number of 166 respondents, 104 of which were male and 62 of which were females. Data were also collected from four high schools in the district concerning male and female enrollment numbers for all beginning and intermediate computer classes.

A survey was developed which addressed attitudes towards computer use. The first part of the survey was adapted from a computer attitude scale used in a published study (Swadener and Hannafin, 1987). It consisted of seventeen questions utilizing a five item Likert scale ranging from strongly disagree to strongly agree and posed questions concerning general attitudes toward computers, self confidence, computer utility, and sex bias.

The second part of the survey consisted of questions relating to male and female role models who use computers, total time spent with computers, and plans for future computer study and professional work.

The data on enrollment figures were analyzed using the Chi-square test of population to determine any differences between males and females and introductory and intermediate level courses.

The data concerning the other variables addressed by the survey were analyzed according to gender and course level differences by comparing their means and performing an analysis of variance (one way ANOVA).

Results

The differences between males and females in beginning and intermediate class were most apparent in the role models available to the students, sex bias and their view of gender differences. The general attitude of the students, perceived usefulness and self confidence in use of computers did not produce significant differences. The charts and graphs illustrating the differences that were found are presented in the appendix 1.

The difference in the numbers of computer students is illustrated by chart 1. The number of females is less for beginning computer courses with the largest difference appearing in the intermediate courses. Anecdotal information from computer teachers indicates that these differences are historical and that the number of beginning class females is usually lower.

The role model data presented (charts 2-5) show that female students in computer classes tend to have a larger number of role models than the males in these classes. This apparent difference is larger for females with female role models than females with male role models.

The attitudes of computer students about males and females in relation to computers is given in sex bias and perceived differences charts 5 and 6. The stereotypical sex bias of males and computers is higher for males than for females with a slight increase from first to second courses. The perception of computers as a male domain is high for beginning females and nonexistent for intermediate females while the same perception increased for males (some student wrote the the low participation of females in intermediate courses is proof of a difference).

Discussion

Some of the more popular beliefs about differences between males and females seem not to be present in this study. The attitudes of females appear to be just as positive toward computers as that of the males in the study. The difference in the sex bias and perceived differences between male and female abilities appear to be related to a readily observable drop in female enrollment in intermediate computer science classes. The striking difference in the total number of role models and female role models for female students in intermediate computer science courses could have the greatest practical significance. The positive encouragement of parents and friends may make the difference between contribution in computer study for females.

Further Study

The differences between females in computer classes and those not taking computer classes would be an avenue of pursuit. The factors that contribute to low enrollment of females in computer science may be evident in students that do not take such courses. There may also some differences between females enrolled in computer science courses and business education computer courses.

STUDY 2

Objectives

The research questions that guided this follow-up study were:

1) Do gender related differences exist between students who have taken at least one elective computer course and those who have not taken any computer course in terms of the following criteria:

general attitudes toward computers
confidence with computers
perceived usefulness of computers
gender related bias toward computer use
plans for further computer study or professional work
role models
experience with computers

2) Do gender related differences exist among the students who have taken at least one elective computer course in terms of the following criteria:

feeling toward the course
interaction with peers in the course
interaction with teachers in the course

Method

This study was conducted in the fall of 1988. Students who were not enrolled in computer courses as well as the students enrolled in computer courses were surveyed. There were a total number of 328 respondents, 195 of which were male and 133 of which were females. Data were collected from the three high schools in the Madison Metropolitan School District. All the students enrolled in computer courses in the three schools were surveyed. Non-computer science student results were obtained by randomly selecting homerooms and having students in the selected homerooms answer the survey. Those who were enrolled both in computer courses and in the selected homerooms did not complete the survey a second time.

The survey developed for the first study was added to and modified for the second study (appendix 4). In part two of the original survey, the following questions were added: whether students have taken any high school elective computer courses or not; how many elective computer courses they have taken in high schools; if they have taken any, how they felt about the overall course, and peers and teachers in the course; and whether they plan to take a computer course later in high schools. A role model check list matrix was developed to replace open-ended questions concerning use of computers by acquaintances in the workplace, home and school. Space was provided for comments about gender related attitudes, computer learning and the importance about computers on the page three as well as for additional overall comments on the page four.

The data concerning students' future plans and attitudes were analyzed using the Mann-Whitney U test to determine any difference between the

students who have taken at least one elective high school computer course and those who have not taken any elective computer course in high school. The same test was also used to determine any difference between the students who intend to take a computer course in high school and those who do not intend to take it in relation to their future plans, attitudes and (if they have taken any computer course) their overall feeling toward the course and interaction with peers and teachers in the course.

The data on total time spent with computers and role models were analyzed by performing the T-test to explore any existence of difference between the students who have taken any elective computer course and those who have not, and between those who intend to take a computer course in high school and those who do not intend to take a course.

Further, in order to establish the strength of the relationships, Pearson R Correlation was calculated for interval data and the Spearman R correlation for Likert scale data. All the statistical analyses were conducted for males and females separately.

Results

Differences between the students who have taken a computer course (tables 3 & 5) and those who have not and between those who intend to take a high school computer course and those who do not were significant for both males and females (appendix 2 contains tables 1-8). Plans for taking a computer course after high school, plans for having a computer related job, perceived usefulness of computers, general attitudes toward computers and confidence with computers were all more positive for computer course students and those who intend to take a computer course. For students' gender related bias toward computer use, differences were apparent only for males. Significant differences were found for both females and males who intend to take a computer course and plan to major in computer science in college. No difference was found for those who have and have not taken computer courses.

Students who have taken a high school computer course (table 7) were asked to describe their overall feeling toward the course, the difference between those who intend to take a computer course in high school and those who do not was significant only for females. Students' overall feeling toward interaction with peers and teachers showed no significant difference.

The correlation data with regard to plans for computer work after high school (table 4) show slight to moderate relationships with computer course participation and the desire to take a computer course. These correlations, however, show little difference between males and females. It can be noted that the only comparisons that were not slightly correlated were for both males and females who have taken a computer course.

The attitudes of respondents (table 6) show mostly moderate correlations in relation to course participation and expressed intent for a computer course. There is little difference in correlations for males and females on any of these scales. The negative values for the sex bias scale is the result of inversion of this scale (less bias is a lower value on the scale).

For students who have taken computer class, the correlation between expressed interest in another course (table 7) and whether they liked the current/past computer course was moderate. The correlation for males and females was similar. All other cells show slight or no correlation.

The hours of use for male and female computer students (table 8) was substantially different than for those who have not taken a computer course. The correlation value for these factors was moderate. The difference between intent to take a course in relation to hours of computer use was only significant for males. The correlation for both males and female was slight.

Role models for students both intending to take a computer course (tables 1 & 2) and actual participants showed significant differences with respect mostly to male role models. These differences were also more prevalent in the home and school than in the workplace. The number of school friends who use computers were significant different for males and females who have taken a computer course. Females who intend to take a computer course knew a significantly larger number of computer using friends than those who did not intend to take a computer course. The males in this category do not show any significant difference.

Students' anecdotal answers to open-ended questions are given in appendix 3. These responses are included to give the reader a better feel for the way in which students view their current or potential participation in computer courses. For the most part they seem illustrative of the significant findings in this study and do not hold any surprises.

Discussion

The overall pattern of computer course participation and intent to participate holds few surprises. The difference in attitudes, interest and participation in computer use seems to be fairly consistent and predictable for both males and females. Only in a few instances do males and females differ on some points. This is perhaps an important consideration because of the generally accepted but not supported claim that some make about differences between males and females.

Students who perceive computers in a positive way are more likely to also be interested in taking a(another) computer course. Students that perceive computers to be useful are more likely to have been enrolled in a computer course. The general attitude toward computers is also more positive for computer students. Self confidence is higher for computer students as well. This is supported in the significant difference in self confidence, perceived usefulness of computers and general attitude scales. The only difference between males and females in attitudes surfaced in the area of sex bias. Males who have participated in a computer class are significantly less biased than those who have not participated. Females on the other hand do not appear to differ greatly in sex bias regardless of course participation. The lower sex bias of males who have taken a computer course is still not as low as females who either have or have not taken a course.

The number of role models for males and females, for the most part, is similar for both genders with a couple of notable exceptions. The data for work role models shows little relationship to participation in computer courses or the intent to participate. This seems to indicate the work place is not particularly important in making course related decisions. The presence of friends who are computer users at home appears to have a differential effect on males. Those with male friends who use computers at home are more likely to be computer course participants and be interested in taking a course. A comparable relationship does not exist for females. There is a male teacher relationship to

participation but this may be explained by the high number of male teachers in computer courses. The most consistent finding is the relationship between computer using friends at school and participation. Females show a strong relations between intent to take a course and computer using friends at school. This is not true for males.

Students who have or are taking computer classes when reporting their peer and teacher interactions do not indicate any relation to future course participation. This may indicate that other factors are greater determinants in their decision than the apparent helpfulness of others in class. Their general like or dislike of the computer class was related to this decision. Possible reasons for this feeling were not included in this survey.

Further Study

The differences and similarities between males and females discovered in this study do not solve the question of unequal participation in computer science classes by males and females. It appears that friends in school are a greater influence for females than males in making computer related decisions but with low initial female participation in computer class this trend may be slow to turn around. A more detailed examination of role models with more sensitive instruments would be in order. Personal interviews with high school students may also shed more light on the reasons for this differential participation.

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Appendix 1

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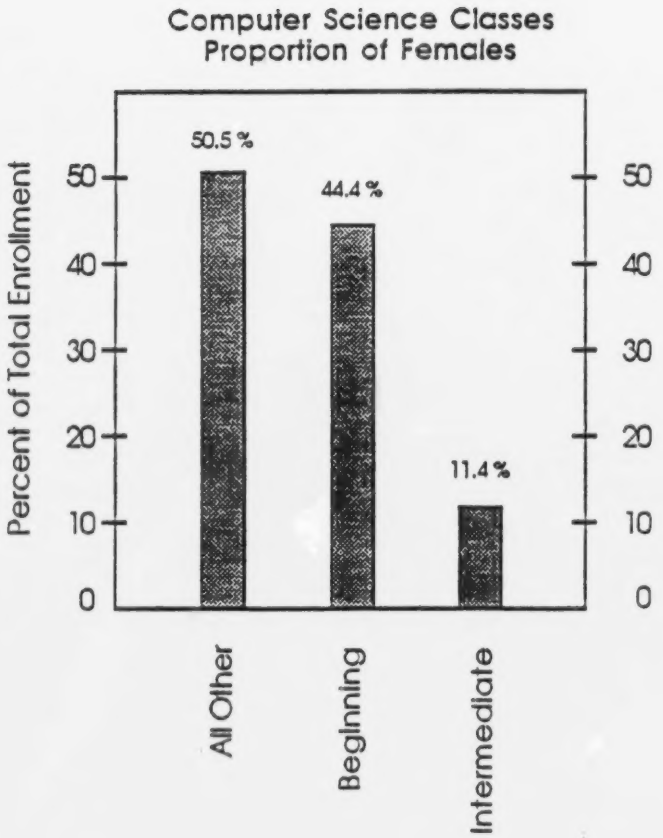
Chart 1



Fall Semester 1987 Enrollment

The percent proportions given are for all computer science classes conducted in the Fall semester of 1987 for four Madison Metropolitan School District High Schools. The 'All Other' catagory represents the proportion of females that are not emrolled in computer science courses.

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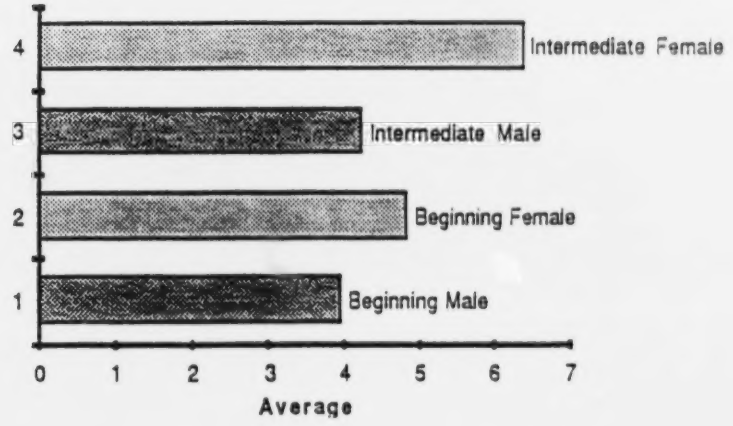
Chart 2

All Role Models Combined



The average number of role models given for home, work and school regardless of role model gender. The averages of role models are given by level of class and gender.

Group	N	Mean	SD
Beginning Male	68	3.96	1.92
Beginning Female	57	4.84	2.40
Intermediate Male	36	4.25	1.57
Intermediate Female	5	6.40	2.30

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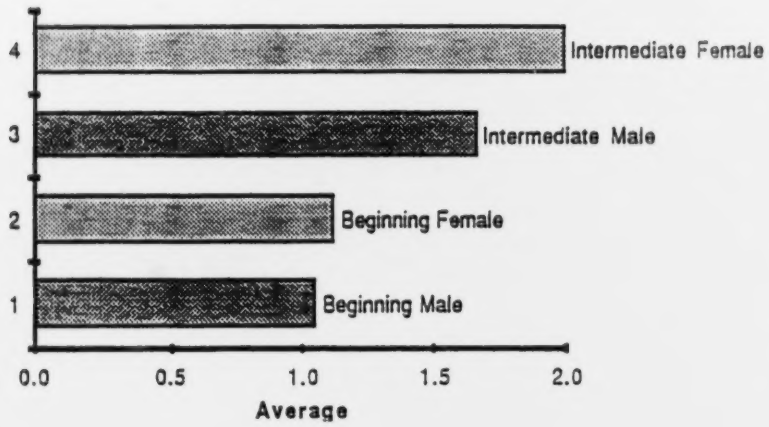
Chart 3

Male Role Models



The average number of role models who are males for home, work and school. The averages of role models are given by level of class and gender.

Group	N	Mean	SD
Beginning Male	68	1.06	1.02
Beginning Female	57	1.12	1.18
Intermediate Male	36	1.17	.97
Intermediate Female	5	2.00	1.00

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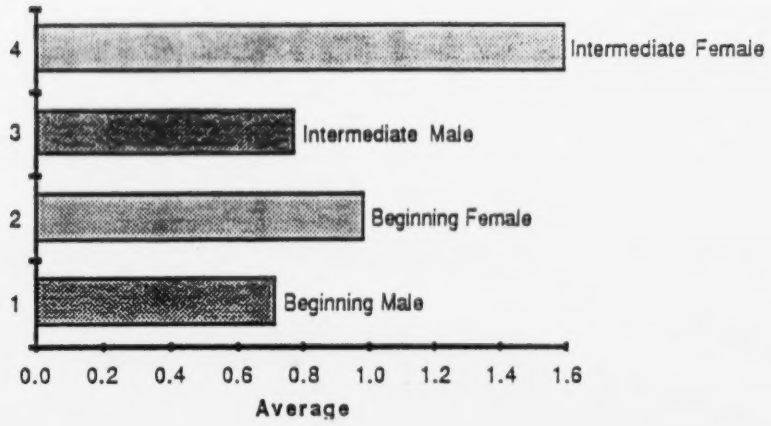
Chart 4

Female Role Models



The average number of role models who are females for home, work and school. The averages of role models are given by level of class and gender.

Group	N	Mean	SD
Beginning Male	68	.72	.75
Beginning Female	57	.98	1.09
Intermediate Male	36	.78	.72
Intermediate Female	5	1.60	1.14

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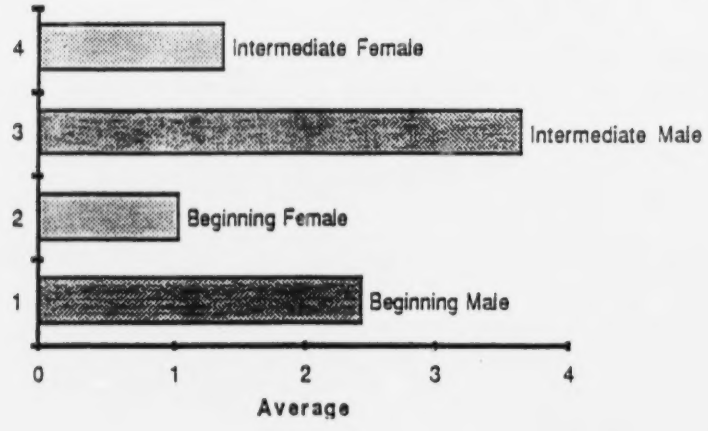
Chart 5

Sex Bias



The average total response to three questions on the ability of males and females to do equally well in working with computers. The averages of sex bias are given by level of class and gender.

Group	N	Mean	SD
Beginning Male	68	2.44	2.50
Beginning Female	57	1.05	1.85
Intermediate Male	36	3.67	2.35
Intermediate Female	5	1.40	2.07

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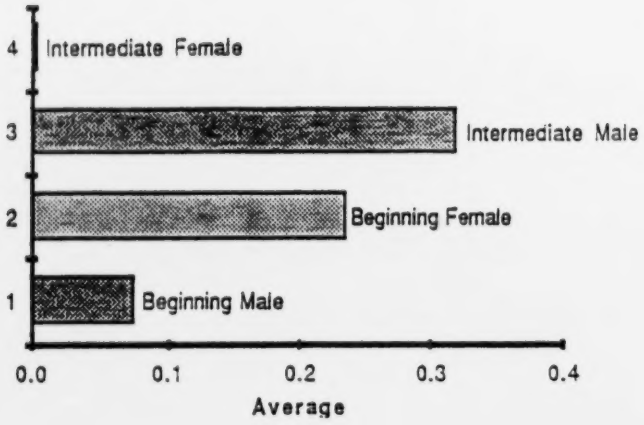
Chart 6

Perceived Difference



The average of the perception that there is no difference between males and females in computer use. A score of 0 indicates that there is no difference and a 1 indicates that there is a difference. The averages of perceived differences are given by level of class and gender.

Group	N	Mean	SD
Beginning Male	52	.08	.27
Beginning Female	52	.06	.24
Intermediate Male	28	.32	.48
Intermediate Female	3	.00	.00

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Appendix 2

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Table 1
Role Models

T-test for the comparison of the number of role models between students who have taken a computer course with those who have not and between those who intend to take a(another) computer course and those who do not intend to take a computer course in high school.

	Taken		Intended	
	Male	Female	Male	Female
WPM	.4188	.5976	.1960	.4858
WPF	.2868	.9270	.6400	.6587
WB	**.0205**	.6761	.1973	na
WS	.8898	.4983	na	.3608
WFrM	.1703	.6309	.6761	.2314
WFrF	.7807	.6821	.8980	.9378
HPM	**.0344**	.2139	.4578	.5028
HPF	.6308	.2832	.6221	.8632
HB	.3610	.3538	.1967	**.0801**
HS	.3315	.6319	na	.8524
HFrM	**.0052**	.6352	**.0942**	.3738
HFrF	.3177	.9025	.6509	.1303
ScTM	**.0000**	**.0005**	.5079	**.0231**
ScTF	**.0576**	.3805	.6974	.8634
SccB	.2965	.3757	.4721	**.0801**
ScS	**.0191**	.2359	.1967	.9030
ScFrM	**.0000**	**.0776**	.2239	**.0696**
ScFrF	**.0000**	**.0206**	.5989	**.0048**

na: SD = 0 for one variable

W - work	H - home	Sc - school
P - parent	B - brother	S - sister
Fr - friend	M - male	F - female

Note: For the purpose of discussion, results that have values less than p = .1000 is considered significant and indicated by bold type. These data may be useful for determining further directions for investigation.

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Table 2
Role Models

Pearson R correlation for the comparison of the number of role models between students who have taken a computer course with those who have not and between those who intend to take a(another) computer course and those who do not intend to take a computer course in high school.

	Taken		Intended	
	Male	Female	Male	Female
WPM	.0612	.0485	.1081*	.0753
WPF	.0788	.0030	.0403	.0472
WB	.1669*	.0387	.1083*	.1445*
WS	.0073	.0621	.1733*	-.0972
WFrM	.0987	.0444	.0361	.1258*
WFrF	.0191	.0387	-.0062	.0011
HPM	.1510*	.1113*	-.0643	.0717
HPF	.0253	.0917	-.0428	.0146
HB	.0673	.0838	.1080*	.1812*
HS	.0711	.0440	.1965*	-.0168
HFrM	.2036*	.0432	.1391*	.0957
HFrF	.0731	.0063	.0391	.1572*
ScTM	.4459**	.3223**	.0578	.2346*
ScTF	.1360*	.0793	.0333	.0147
SccB	.0764	.0800	-.0624	.1811*
ScS	.1683*	.1064*	.1083*	.0079
ScFrM	.4352**	.1568*	.1032*	.1877*
ScFrF	.3664**	.2038*	.0455	.2939*

* Slight
** Moderate
*** Strong

W - work	H - home	Sc - school
P - parent	B - brother	S - sister
Fr - friend	M - male	F - female

Note: For the purpose of discussion, results that have values between .1000 and 3.000 are considered slight, between .3000 and point .5000 are considered moderate and those above .5000 are considered strong.

Table 3
After High School Plans

Mann-Whitney test for the comparison of post high school participation in computer related activities.

	Taken		Intended	
	Male	Female	Male	Female
After high school course	**.0000**	**.0180**	**.0545**	**.0128**
Computer science major	.3618	.7432	**.0134**	**.0730**
Computer job	**.0001**	**.0010**	**.0001**	**.0007**

Note: For the purpose of discussion, results that have values less than p = .1000 is considered significant and indicated by bold type.

Table 4
After High School Plans

Spearman R correlation for the comparison of post high school participation in computer related activities.

	Taken		Intended	
	Male	Female	Male	Female
After high school course	.2436*	.2406*	.2222*	.2950*
Computer science major	.0742	.0342	.2336*	.1969*
Computer job	.3460**	.3302**	.4475**	.4304**

* Slight
** Moderate
*** Strong

Note: For the purpose of discussion, results that have values between .1000 and 3.000 are considered slight, between .3000 and point .5000 are considered moderate and those above .5000 are considered strong.

Table 5
Attitudes

Mann-Whitney test for the comparison of student attitudes in relation to gender bias, utility of computers, general attitude toward computers and self confidence in the use of computers.

	Taken		Intended	
	Male	Female	Male	Female
Sex bias	**.0635**	.2335	**.0445**	.6564
Utility	**.0004**	**.0001**	**.0000**	**.0001**
General attitude	**.0000**	**.0001**	**.0004**	**.0034**
Self confidence	**.0000**	**.0002**	**.0000**	**.0002**

Note: For the purpose of discussion, results that have values less than p = .1000 is considered significant and indicated by bold type.

Table 6
Attitudes

Spearman R correlation for the relationship of student attitude to gender bias, utility of computers, general attitude toward computers and self confidence in the use of computers.

	Taken		Intended	
	Male	Female	Male	Female
Sex bias	-.1351*	-.1160*	-.1865*	-.1198*
Utility	.2771*	.4092**	.3601**	.3196**
General attitude	.4117**	.3565**	.5565***	.5099***
Self confidence	.5664***	.6766***	.4687**	.4447**

* Slight
** Moderate
*** Strong

Note: For the purpose of discussion, results that have values between .1000 and 3.000 are considered slight, between .3000 and point .5000 are considered moderate and those above .5000 are considered strong.

Table 7
Attitudes

Mann-Whitney test and Spearman R correlation for the comparison of student attitudes in relation to how they liked computer class(es), the helpfulness of peers and availability of teachers for assistance between those students who have indicated they would take another computer class and those who would not take another computer class.

	Mann-Whitney		Correlation	
	Male	Female	Male	Female
Liked class	.1358	**.0583**	.3313**	.3407**
Helpfulness of peers	.6182	.4946	.0900	.1366*
Availability of teachers	.8451	.3878	.0517	.2485*

* Slight
** Moderate
*** Strong

Note: For the purpose of discussion, results that have values less than p = .1000 is considered significant and indicated by bold type. Correlation results that have values between .1000 and 3.000 are considered slight, between .3000 and point .5000 are considered moderate and those above .5000 are considered strong.

Table 8
Hours of use

T-tests and Pearson R correlation for the comparison of hours of computer use in relation to participation in computer courses and intent to participate in a computer course.

	Taken		Intended	
	Male	Female	Male	Female
T-test	**.0001**	**.0000**	**.0568**	.2415
Correlation	.3057**	.4581**	.1582*	.1229*

* Slight
** Moderate
*** Strong

Note: For the purpose of discussion, results that have values less than p = .1000 is considered significant and indicated by bold type. Correlation results that have values between .1000 and 3.000 are considered slight, between .3000 and point .5000 are considered moderate and those above .5000 are considered strong.

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Appendix 3

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APPENDIX 3

1: female
Why haven't you taken a high school computer course?
"I don't understand them and I am afraid to flunk. Computers are for smart people."

Would you take a computer course in high school if possible?
"Yes, if I thought the teacher could teach it to me."

Make any additional comments concerning computer courses.
"I'd like to learn. It is not like I hate them. I would not mind sitting behind a computer for 8 hours a day. I hope I will understand them more someday."

2: female
Why haven't you taken a high school computer course?
"Because I don't like computers. They are confusing and smarter than I am, and I don't understand how to use them."

Give your thoughts about: some people think that it is difficult to learn to use computers.
"Yes, it is. The computer is smarter than you and it makes you feel stupid when you did not do something right."

3: female
Give your thought about: some people think that it is becoming increasingly important to know how to use the computer.
"It is and that is not good because they will over run the world."

4: male
Make any additional comments concerning computer courses.
"Courses should be less lecture and more hands on type work. Lectures could be given in the lab so the students can see how the work is applied first hand."

5: male
Make any additional comments concerning computer courses.
"I'd take some more classes if they were available."

6: female
Why haven't you taken a high school computer course?
"Because I don't have a computer at home. I don't have any use to yet."

7: male
Give your thought about: some people think that it is difficult to learn to use the computer.
"Yes, it is, if you don't have a good teacher."

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8 : female

Make any additional comments concerning computer courses.

"There should be a class just for typing like on an every other day basic for only like a half hour schedule. Because I don't want a computer major, I want to know how to type."

9 : female

Why haven't you taken a high school computer course?

"I don't like working with computers and it is too much like typing."

Give your thought about: some people think that there is a difference between males and females in how they feel about computers.

"It seems like guys think that using a computer is uncool, but girls are a little more open-minded."

10 : female

Why haven't you taken a high school computer course?

"Because there are other important classes that I need to take."

11 : female

Give your thought about: some people think that it is becoming increasingly important to know how to use the computer.

"For people who are not willing to learn, that can be difficult. Otherwise it is very easy to learn."

Appendix 4

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Computer Survey

Circle the letters that most closely match how you feel about each statement.

SD - Strongly Disagree D - Disagree NO - No Opinion A - Agree SA - Strongly Agree

1.	I would like to own my own computer.	SD	D	NO	A	SA
2.	Working with a computer makes me want to learn.	SD	D	NO	A	SA
3.	I learn a lot with a computer.	SD	D	NO	A	SA
4.	Being able to work with a computer is important.	SD	D	NO	A	SA
5.	I like to use a computer.	SD	D	NO	A	SA
6.	I like using computers in school.	SD	D	NO	A	SA
7.	I enjoy making a computer do what I want.	SD	D	NO	A	SA
8.	I don't like working on a computer.	SD	D	NO	A	SA
9.	Computers are a tool just like a hammer or saw.	SD	D	NO	A	SA
10.	Using a computer is a waste of time.	SD	D	NO	A	SA
11.	Using computers is more for boys than for girls.	SD	D	NO	A	SA
12.	People don't need computers.	SD	D	NO	A	SA
13.	I enjoy using the computer.	SD	D	NO	A	SA
14.	Computers are more for boys than girls.	SD	D	NO	A	SA
15.	I am good at running a computer.	SD	D	NO	A	SA
16.	Girls do just as well as boys in computer jobs.	SD	D	NO	A	SA
17.	I don't work well with computers.	SD	D	NO	A	SA

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Computer Survey

Please circle: Grade 9 10 11 12

Age 14 15 16 17 18

Sex Male Female

Estimate the average number of hours per week that you use a computer at:

Home _____ School _____ Work _____ Other _____ Where?

A **Answer questions in this section if you have *not* taken a computer course.**

Why haven't you taken a high school computer course?

Would you take a computer course in high school if possible? yes no don't know

Please Explain.

B **Answer this set of questions if you have taken a computer science course.**

How many high school computer science courses have you taken (including current)? _____

Please list.

Circle the work or phrase that best describes your previous computer science course(s)?

I (liked, disliked) my previous computer science classes.

Classmates were (helpful, not helpful) when I needed help with assignments.

My computer teacher was usually (available, busy) when I needed help.

Would you take another computer course in high school if possible? yes no don't know

Please Explain.

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C **Please answer all questions.**

After high school, will you take a computer course(s)?	yes	no	don't know
Do you plan to major in computer science in college?	yes	no	don't know
Would you like a job working with computers?	yes	no	don't know

Check the people that you personally know who use computers at work, home or school:

	Parent/Guardian				Friends	
	Male	Female	Brother	Sister	Male	Female
Work	____	____	____	____	____	____
Home	____	____	____	____	____	____

	Teachers				Friends	
	Male	Female	Brother	Sister	Male	Female
School	____	____	____	____	____	____

Please give your thoughts about the following statements:

Some people think that there is a difference between males and females in how they feel about computers.

Some people think that it is difficult to learn to use the computer.

Some people think that it is becoming increasingly important to know how to use the computer.

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Thanks for your cooperation in answering the questions on this survey. Please make any additional comments concerning computer courses that you would like on this page.

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